



## **Episode Twenty Two - Water testing**

Welcome to episode 22 of Food Safety Bites, brought to you the University of Wisconsin Madison, and funded by the USDA Food Safety Outreach Program. This is your host Harriet Behar. This episode is **water testing for both production and post-harvest handling**. In these podcast episodes, I will identify issues, and provide suggestions for how to reduce various fresh produce contamination risks and keep your customers safe. We will not talk in detail about what is required for a GAP audit or a FSMA inspection. If you want more information on those, please see the links on the website where you found these podcasts.

In this episode, I will continue my discussion on agricultural production and post-harvest water from the previous episodes and focus on testing types and frequency.

**Agricultural Water Testing**-Water testing is important for all farms as a way to understand the quality of the water used during production and washing of fresh produce. If your farm is covered under the Food Modernization Production Act produce safety rule, this rule has specific mandates on the type of and frequency of agricultural water testing.

**What do I test for?** Generic *E. coli* is the only organism farms are required to test their water sources for in the Food Safety Modernization Act Produce Safety Rule. This test is also required for a USDA GAP audit. You can test for other things like nitrates, nitrites, or other heavy metals, but generic *E. coli* is all that is required. It is what is known as an indicator organism. If it is present in water, it means that fecal contamination is getting into the well somehow - maybe through a cracked liner, a leaking septic, or runoff from nearby animals. Coliform testing is a more general test for contamination and is typical of residential water testing, but as a commercial enterprise selling produce, you should test for generic *e. coli*.

Tell the lab that you are interested in testing your agricultural water for generic *E. coli*. It is recommended that you get an enumerated count, meaning the result will indicate how much *E. coli* is present, not just if it is present or absent. If your well or surface water has *E. coli*, it is also more likely to have other pathogens like Salmonella, Cryptosporidium, parasites and other things that go along with fecal contamination. Your extension agent or State Department of Public Health should have a listing of water testing laboratories in your region. You can check with your post office to determine how long it takes for the sample to get to lab.

**How often to test?** - For all farms, regardless of if you need to comply with the Produce Safety Rule, it is a good idea to verify your well water is free of bacterial contaminants at least once per year. For groundwater sources like a well, the Produce Safety Rule, requires 4 tests the first year, and one test per year thereafter. The four tests in the first year are meant to see if there are any particular times of year of concern. It is a good idea to test your water at times of year when you will be using it, and perhaps do that testing at different times from year to year, if you only take a test on this water source once per year. If you have an issue with flood water or other possible contamination events moving over or sitting near your well-head, it is a good idea



to sample and test the water after this event, to make sure the potential levels of generic e. coli of that water has not changed.

**Surface water:** For surface water like ponds and streams sources or non-potable waters, the Produce Safety Rule requires a minimum of 20 water samples to be taken as close to the various times of year you are harvesting, over the course of 2-4 years, and then 5 times annually after the initial testing period. While this may sound like a lot of tests, think about how variable surface water is. It changes constantly, and rain event or new cattle grazing upstream can change the quality dramatically. Even if you are not subject to following this regulation, this extensive testing can help you to assess, over numerous years, the change in contamination risks you might see over the growing season. This knowledge is very important to help farmers choose the safest source at the safest time when using surface waters. You can have some confidence that your decisions are based on data and can choose to use that water for agricultural production during times of least contamination, especially on crops that have the highest risk.

**Where to take the test sample:** All water tests should be taken as close to the source as possible. If it is a well, take it as close as possible to the well head. This will allow you to see if there is any contamination from the actual well. If you are irrigating, it might be a good idea to take another one from the distribution line or end of the irrigation line to see if there is contamination in the line somewhere

**Finding a lab-** It may take some time to find a testing laboratory that can test for generic E. coli within your region. Your extension agent or State Department of Public Health should have a list of water testing laboratories in your region Follow directions carefully from the lab - for some tests, the sample may need to arrive at the lab within 6 hours of filling the sample container to achieve an accurate result, some are up to 48 hours. You will likely need to keep the sample on ice. You may need to drive your sample to the lab or send it priority or express delivery in order to give you accurate information. Water testing will likely be about \$40 per per sample.

If your farm is covered by the Produce Safety Rule, the type of testing done by the lab is regulated under the law, so make sure the lab you choose is using allowable methods. There will be a link on the food safety bites website to help you understand this requirement and the types of tests that are allowed.

**How to sample your water-** First, call ahead to the lab you will use for the testing. The lab will send you collection bottles and instructions. Read and follow these directions carefully. Write your farm's information and the sample ID number on the collection bottle.

Before collecting your sample, clean the faucet with diluted bleach or alcohol to remove any potential contamination. Then, open the hydrant and allow the water to run for 1-2 minutes, or as indicated on the instructions from the lab. Your goal is to flush out any stagnant water that has been sitting in the lines, so you may need to flush for a longer time if you have a longer line from the well to the sampling point.



Carefully remove the plastic seal from the bottle and remove the cap. Hold the cap by the outside to avoid contamination. It is important that you do not touch or otherwise contaminate the inside of the bottle or cap. The bottle might have powder or a capsule in it. Do not rinse or remove this powder.

Fill water to the sample bottle to the 100 mL fill line. You can go a little over the 100 mL line, but do not allow the bottle to overflow. Screw the lid on tightly to prevent leakage. Refrigerate or cool the sample until you are ready to send to the laboratory, such as in a small cooler with ice packs. Make sure that the sample does not freeze.

**What do I do with the results from the lab?** If you get a positive test for generic e coli in groundwater source, you might want to test again right away, to ensure that there was not a false positive. Be careful taking the second test, that first positive test could have been the result of improper sampling methods, dirty hands, or a dirty container. **In the meantime, don't use this water for post-harvest activities, since water used for postharvest uses must have no detectable generic e coli.** If it comes back positive again, consider having the well driller come and review your well. Is there a defective well cap or another way that contaminants could be entering your well? They can do a "shock" of the well with chlorine to remove the bacteria. If the positive tests continue after this activity, then you know you have an issue with the well and you will need to fix the problem and may even need to put in a new well. Work with a professional to determine your next steps.

If you are testing surface water and there is generic E. coli, you might be able to use this water for irrigation purposes if the levels are within an acceptable range. But remember surface water, and water with any detectable e coli cannot be used for postharvest uses like washing. When irrigating, you can use a wait time, or a "die off" period, between application of this water and harvest to allow for the pathogens to die off to acceptable levels. There are times that the contamination levels are so high, that the wait time would not be practical. If you can, avoid the high-level sources and times of year when contamination is present. There is a link to this wait time calculation information between irrigation and harvest on the website where you found these food safety bites episodes.

**Recordkeeping-** Find a place to put your water test results and keep all of them so you have an invaluable historical record of fluctuations, especially for any surface water testing you do. If your farm is covered by the Produce Safety Rule, you will need to keep records of your water testing results and of your annual inspection of your water distribution systems. A GAP audit will also require annual water testing and records to prove that testing.

So that's it for this episode of Food Safety Bites, the next episode is infiltration. This is your host Harriet Behar brought to you by the University of Wisconsin Madison, talk to you next time!